

Potential solvent for reconditioning polyolefin waste materials

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ABSTRACT

Waste polymer reconditioning was examined by a method of dissolution/precipitation on low- and high-density polyethylene (PE) and polypropylene (PP). Toluene and petroleum ether, in different proportions, were used as solvents, and n-hexane was used as a non-solvent. Commercial polymer products used on an everyday basis were used with a virgin polymer, to optimize the qualities of the final product, and 98% polymer was recovered in each case. Fourier transform infrared spectroscopy (FTIR) images and tensile mechanical properties of the samples, before and after recycling, were analyzed. The potential recycling-based degradation of the polymer was further investigated by measuring the thermal properties (melting point and crystallinity) before and after recycling, using differential scanning calorimetry (DSC). High reconditioning was observed in most recycled samples, with no significant difference from the virgin materials. The studied technique seems to be viable for waste polyolefin polymer recycling.

KEYWORDS:

dissolution/precipitation; reconditioning; waste polymer

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